

*What Is Claimed Is:*

1. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

- (a) a nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence in Figures 1A and 1B (SEQ ID NO:2);
- (b) a nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence encoded by the cDNA clone contained in the deposit having ATCC accession number 97768;
- (c) a nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide extracellular domain;
- (d) a nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide transmembrane domain;
- (e) a nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide intracellular domain;
- (f) a nucleotide sequence encoding a soluble Neutrokin- $\alpha$  polypeptide comprising the extracellular and intracellular domains but lacking the transmembrane domain; and
- (g) a nucleotide sequence complementary to any of the nucleotide sequences in (a), (b), (c), (d), (e) or (f) above.

2. The nucleic acid molecule of claim 1 wherein said polynucleotide has the complete nucleotide sequence in Figures 1A and 1B (SEQ ID NO:1).

3. The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence in Figures 1A and 1B (SEQ ID NO:1) encoding the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence in Figures 1A and 1B (SEQ ID NO:2).

5 4. The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence encoding a soluble Neutrokin- $\alpha$  polypeptide comprising the extracellular domain shown in Figures 1A and 1B (SEQ ID NO:2).

10 5. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a nucleotide sequence encoding a polypeptide having the amino acid sequence consisting of residues n-285 of SEQ ID NO:2, where n is an integer in the range of 2-190

15 (b) a nucleotide sequence encoding a polypeptide having the amino acid sequence consisting of residues 1-m of SEQ ID NO:2, where m is an integer in the range of 274-284;

(c) a nucleotide sequence encoding a polypeptide having the amino acid sequence consisting of residues n-m of SEQ ID NO:2, where n and m are integers as defined respectively in (a) and (b) above; and

20 (d) a nucleotide sequence encoding a polypeptide consisting of a portion of the complete Neutrokin- $\alpha$  amino acid sequence encoded by the cDNA clone contained in the deposit having ATCC accession number 97768, wherein said portion excludes from 1 to 190 amino acids from the amino terminus and from 1 to 11 amino acids from the C-terminus of said complete amino acid sequence.

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6. The nucleic acid molecule of claim 1 wherein said polynucleotide has the complete nucleotide sequence of the cDNA clone contained in the deposit having ATCC accession number 97768.

5 7. The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence encoding the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence encoded by the cDNA clone contained in the deposit having ATCC accession number 97768.

10 8. The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence encoding a soluble Neutrokin- $\alpha$  polypeptide comprising the extracellular domain encoded by the cDNA clone contained in the deposit having ATCC accession number 97768.

15 9. An isolated nucleic acid molecule comprising a polynucleotide which hybridizes under stringent hybridization conditions to a polynucleotide having a nucleotide sequence identical to a nucleotide sequence in (a), (b), (c), (d), (e) or (f) of claim 1 wherein said polynucleotide which hybridizes does not hybridize under stringent hybridization conditions to a polynucleotide having a nucleotide sequence  
20 consisting of only A residues or of only T residues.

10. An isolated nucleic acid molecule comprising a polynucleotide which encodes the amino acid sequence of an epitope-bearing portion of a Neutrokin- $\alpha$  polypeptide having an amino acid sequence in (a), (b), (c), (d), (e) or (f) of claim 1.

25 11. The isolated nucleic acid molecule of claim 10, which encodes an epitope-bearing portion of a Neutrokin- $\alpha$  polypeptide selected from the group

consisting of: a polypeptide comprising amino acid residues from about Phe-115 to about Leu-147 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Ile-150 to about Tyr-163 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Ser-171 to about Phe-194 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Glu-223 to about Tyr-246 (SEQ ID NO:2); and a polypeptide comprising amino acid residues from about Ser-271 to about Phe-278 (SEQ ID NO:2).

12. A method for making a recombinant vector comprising inserting an isolated nucleic acid molecule of claim 1 into a vector.

13. A recombinant vector produced by the method of claim 12.

14. A method of making a recombinant host cell comprising introducing the recombinant vector of claim 13 into a host cell.

15. A recombinant host cell produced by the method of claim 14.

16. A recombinant method for producing a Neutrokin- $\alpha$  polypeptide, comprising culturing the recombinant host cell of claim 15 under conditions such that said polypeptide is expressed and recovering said polypeptide.

17. An isolated Neutrokin- $\alpha$  polypeptide comprising an amino acid sequence at least 95% identical to a sequence selected from the group consisting of:

(a) the amino acid sequence of the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence in Figures 1A and 1B (SEQ ID NO:2);

(b) the amino acid sequence of the Neutrokin- $\alpha$  polypeptide having the complete amino acid sequence encoded by the cDNA clone contained in the deposit having ATCC accession number 97768;

(c) the amino acid sequence of the Neutrokin- $\alpha$  polypeptide extracellular domain;

(d) the amino acid sequence of the Neutrokin- $\alpha$  polypeptide transmembrane domain;

(e) the amino acid sequence of the Neutrokin- $\alpha$  polypeptide intracellular domain;

(f) the amino acid sequence of a soluble Neutrokin- $\alpha$  polypeptide comprising the domain; and

(g) the amino acid sequence of an epitope-bearing portion of any one of the polypeptides of (a), (b), (c), (d), (e) or (f).

18. An isolated polypeptide of claim 17 comprising an epitope-bearing portion of the Neutrokin- $\alpha$  protein, wherein said portion is selected from the group consisting of: a polypeptide comprising amino acid residues from about Phe-115 to about Leu-147 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Ile-150 to about Tyr-163 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Ser-171 to about Phe-194 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Glu-223 to about Tyr-246 (SEQ ID NO:2); a polypeptide comprising amino acid residues from about Ser-271 to about Phe-278 (SEQ ID NO:2).

19. An isolated antibody that binds specifically to a Neutrokin- $\alpha$  polypeptide of claim 17.

20. A pharmaceutical composition comprising a polypeptide of claim 17 and a pharmaceutically acceptable carrier.

21. An isolated polynucleotide encoding a modified Neutrokin- $\alpha$  protein, wherein, except for at least one conservative amino acid substitution, said modified peptide has an amino acid sequence that is identical to a member selected from the group consisting of:

- (a) amino acids 1 to 285 of SEQ ID NO:2;
- (b) amino acids 2 to 285 of SEQ ID NO:2;
- (c) amino acids 1 to 46 of SEQ ID NO:2;
- (c) amino acids 47 to 72 of SEQ ID NO:2; and
- (c) amino acids 73 to 286 of SEQ ID NO:2.

22. A modified Neutrokin- $\alpha$  polypeptide molecule, wherein, except for at least one conservative amino acid substitution, said modified peptide has an amino acid sequence that is identical to a member selected from the group consisting of:

- (a) amino acids 1 to 285 of SEQ ID NO:2;
- (b) amino acids 2 to 285 of SEQ ID NO:2;
- (c) amino acids 1 to 46 of SEQ ID NO:2;
- (c) amino acids 47 to 72 of SEQ ID NO:2; and
- (c) amino acids 73 to 286 of SEQ ID NO:2.

23. An isolated nucleic acid molecule comprising a polynucleotide having a sequence at least 95% identical to a sequence selected from the group consisting of:

- (a) the nucleotide sequence of SEQ ID NO:7;
- (b) the nucleotide sequence of SEQ ID NO:8;

(c) the nucleotide sequence of SEQ ID NO:9;

(d) the nucleotide sequence of a portion of the sequence shown in Figures 1A and 1B (SEQ ID NO:1) wherein said portion comprises at least 30 contiguous nucleotides from nucleotide 1 to nucleotide 2442, excluding the sequence from nucleotide 1387 to 1421, the sequence from nucleotide 9 to 382, the sequence from nucleotide 1674 to 1996, the sequence from nucleotide 1401 to 1784, the sequence from nucleotide 900 to 1237, and any fragments located within these sequences; and

(e) a nucleotide sequence complementary to any of the nucleotide sequences in (a), (b), (c) or (d) above.

24. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a nucleotide sequence encoding the Neutrokin-alphaSV polypeptide having the complete amino acid sequence in Figures 5A and 5B (SEQ ID NO:19);

(b) a nucleotide sequence encoding the Neutrokin-alphaSV polypeptide having the complete amino acid sequence encoded by the cDNA clone contained in the deposit having ATCC accession number 203518;

(c) a nucleotide sequence encoding the Neutrokin-alphaSV polypeptide extracellular domain;

(d) a nucleotide sequence encoding the Neutrokin-alphaSV polypeptide transmembrane domain;

(e) a nucleotide sequence encoding the Neutrokin-alphaSV polypeptide intracellular domain;

(f) a nucleotide sequence encoding a soluble Neutrokin-alphaSV polypeptide comprising the extracellular and intracellular domains but lacking the transmembrane domain; and

(g) a nucleotide sequence complementary to any of the nucleotide sequences in (a), (b), (c), (d), (e) or (f) above.

25. The isolated antibody of claim 19 wherein said isolated antibody inhibits  
5 binding of the protein of SEQ ID NO:2 to a Neutrokin-alpha receptor.

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